3.1 Start Thinking

Consider the equation $y = |x|$.

Are there any values of x that you cannot substitute into the equation? If so, what are they? Are there any values of y that you cannot obtain as an answer? If so, what are they?

3.1 Warm Up

In Exercises 1–9, use one coordinate plane to plot the points.

1. $A(4, 2)$ **2.** $B(-2, 2)$ **3.** $C(-2, 0)$

4. $D(2, -4)$ **5.** $E(7, -4)$ **6.** $F(-6, -10)$

7. $G(10, -7)$ **8.** $H(-8, -4)$ **9.** $I(9, 4)$

3.1 Cumulative Review Warm Up

Solve the inequality. Graph the solution.

1. $x + 5 > -6$ **2.** $7 \leq m + 0$

3. $r - 5 > 4$ **4.** $10 - w < 6$

5. $h + 3 \leq 9$ **6.** $j - 10 + 2 > 9$

7. $9 \leq 4p + p + 8$ **8.** $n - 9 < 10$

Name _____ Date _____

3.1 Practice A

In Exercises 1 and 2, determine whether the relation is a function. Explain.

1.

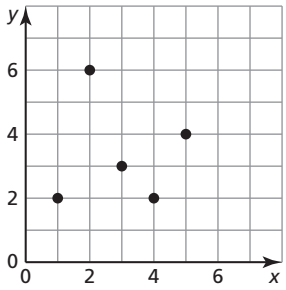
Input, *x*	8	4	2	4	8
Output, *y*	−4	−2	0	2	4

2.

Input, *x*	0	2	4	6	8
Output, *y*	3	7	11	15	19

In Exercises 3 and 4, determine whether the graph represents a function. Explain.

3.



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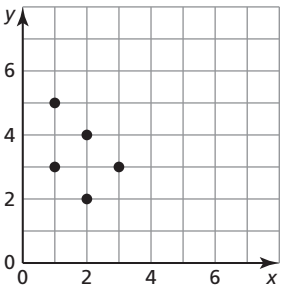
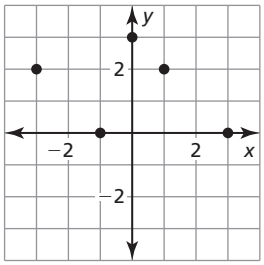


In Exercises 5 and 6, find the domain and range of the function represented by the graph.

5.



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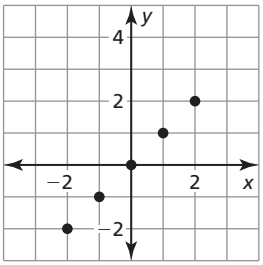


7. The function $y = 7x + 35$ represents the monthly cost y (in dollars) of a group of x members joining the fitness club.

a. Identify the independent and dependent variables.

b. Your group has enough money for up to six members to join the fitness club. Find the domain and range of the function.

In Exercises 8 and 9, determine whether the statement uses the word *function* in a way that is mathematically correct. Explain your reasoning.

8. A function pairs each teacher with 30 students.

9. The cost of mailing the package is a function of the weight of the package.

Name_____ Date _____

3.1 Practice B

In Exercises 1 and 2, determine whether the relation is a function. Explain.

1.

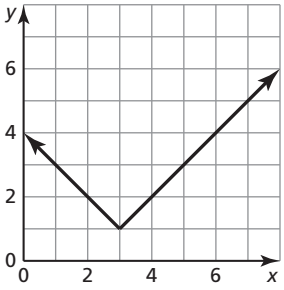
Input, *x*	0	1	3	2	1
Output, *y*	1	5	10	15	20

2.

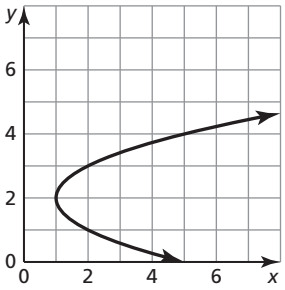
Input, *x*	0	1	2	3	4
Output, *y*	−14	−7	0	7	14

In Exercises 3 and 4, determine whether the graph represents a function. Explain.

3.

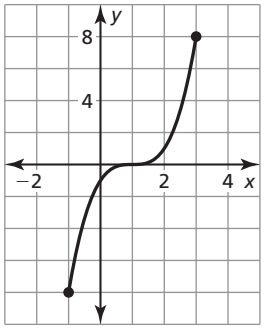


4.

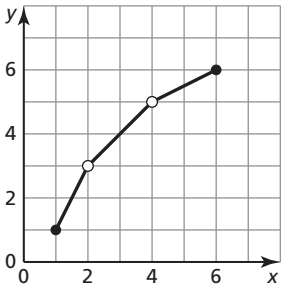


In Exercises 5 and 6, find the domain and range of the function represented by the graph.

5.



6.



7. The function $2x + 1.5y = 18$ represents the number of book raffle tickets x and food raffle tickets y you buy at a club event.

a. Solve the equation for y.

b. Make an input-output table to find ordered pairs for the function.

c. Plot the ordered pairs in a coordinate plane.

In Exercises 8–10, find the domain and range of the function.

8. $y = |x| + 2$

9. $y = -|x| + 1$

10. $y = -|x| - 3$

Name _____ Date _____

3.1 Enrichment and Extension

A Quadratic Function: The Diving Problem

You are jumping off the 10-foot diving board at the local pool. You bounce up at 6 feet per second and then drop toward the water. Your height h above the water, in terms of time t, follows the function shown.

$$h(t) = -16t^2 + 6t + 10$$

a. Graph this function, with t on the horizontal axis. Fill in a table of values where the increments of time are tenths of a second.

b. Explain what the ***domain*** and ***range*** might be and why.

c. Explain why this situation is quadratic instead of linear. Give a graphical explanation and a logical explanation.

d. Use the graph to determine the maximum height of your dive.

e. Use the graph to determine when you reach the maximum height of your dive.

f. Use the graph to determine how long it takes you to hit the water.

g. Use the ***quadratic formula*** to prove your answer in part (f).

Name_____ Date _____

3.1 Puzzle Time

What Has A Foot On Each End And One In The Middle?

Write the letter of each answer in the box containing the exercise number.

Determine whether the relation is a function.

1. $(8, 5), (6, -2), (4, -9), (2, -6), (4, 7)$

H. yes **I.** no

2. $(2, -3), (3, 2), (4, 7), (5, 14), (6, 23)$

A. yes **B.** no

3. $(-11, 2), (-9, 2), (-7, 3), (-5, 3), (-3, 3)$

A. yes **B.** no

4. $(1, -4), (2, 1), (3, 4), (3, 3), (4, 2)$

B. yes **C.** no

5. $(17, -3), (2, -2), (1, 1), (2, 2), (17, 3)$

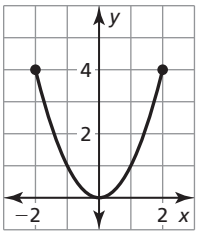
C. yes **D.** no

6. $(-4, 12), (1, 6), (4, -2), (7, -8), (10, -14)$

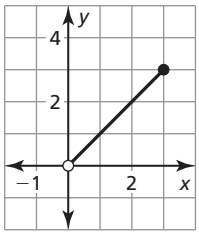
K. yes **L.** no

Find the domain and range of the function represented by the graph.

7.



8.



S. D: $0 \le x \le 4$, R: $-2 \le y \le 2$

T. D: $-2 \le x \le 2$, R: $0 \le y \le 4$

Q. D: $0 \le x \le 3$, R: $0 \le y \le 3$

R. D: $0 < x \le 3$, R: $0 < y \le 3$

Use the following information to answer Exercises 9 and 10. The function $t = -8j + 24$ represents the number of tomatoes t that your neighbor has left after making j jars of homemade salsa.

9. Identify the dependent variable.

R. jars of salsa **S.** tomatoes

10. Identify the independent variable.

Y. jars of salsa **Z.** tomatoes

3		10	2	8	5	9	7	1	4	6